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ABSTRACT

This study examined the generalizability of the internal/external (I/E) frame of reference model of academic self-concept development. The "external" component of the model refers to comparing one's achievement with one's peers; in LISREL causal modeling, this external comparison is presented as positive paths. The "internal" component refers to comparing one's achievement in one academic area to another area to determine one's ability; in LISREL causal modeling, this internal comparison is presented as negative paths. The two paths should cause a student's math and verbal self-concepts to be uncorrelated, even though achievement in these areas is highly correlated. The I/E model has been demonstrated on Australian and Canadian children and adolescents. This study sought to determine whether the model was generalizable to an American sample and across different measures of academic self-confidence, and whether there were gender differences in the operation of the I/E model. For 152 seventh and eight graders in a Florida middle school, math and language arts grades were obtained to measure achievement, and self-description questionnaires were administered to measure self-confidence. Verbal and math self-concepts were uncorrelated, and the positive paths from math and verbal achievement to math and verbal self-concept were both significant. However, the negative path from math achievement to verbal self-confidence was not significant. No evidence of gender difference was found. (TM)

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The Internal/External Frame of Reference Model of Academic Self-Concept in Early Adolescents

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In the present study, the generalizability of the Internal/External (I/E) frame of reference model was examined. This model of academic self-concept development has been demonstrated on Australian and Canadian children and adolescents (Marsh, 1988; 1990a). LISREL causal modeling and multi-sample analyses (Joreskog & Sorbom, 1987) were employed to examine (1) if the I/E model was generalizable to an American sample; (2) if the model was generalizable across different measures of academic self-concept; and (3) if there were gender differences in the operation of the I/E model.

The "external" component of the I/E model refers to the influence of social comparison on one's math and verbal self-concepts. For example, if one performs well in math relative to one's peers, this should contribute to a high math self-concept. In LISREL causal modeling, this external comparison process is represented by the two positive paths (see Figure 1). The "internal" component refers to the process of comparing one's performance in an academic area (e.g., math) with one's performance in another area (e.g., verbal) to infer one's ability in each area. For example, if one performs better in verbal areas than in math, this could cause one to lower one's math self-concept and/or raise one's verbal self-concept from where these self-concepts would be based on external comparisons. In LISREL causal modeling, this internal comparison process is represented by the two negative paths (see Figure 1). The internal (negative paths) and external (positive paths) components combined should cause math and verbal self-concepts to be uncorrelated, even though math and verbal achievements are highly correlated.

The I/E model was proposed by Marsh and his colleagues to explain why math and verbal self-concepts are often uncorrelated with each other (Marsh, 1986), despite the fact that (1)math achievement and verbal achievement are highly correlated with each other (r's of .5 to .8), and that (2) math and verbal self-concepts are highly correlated with their respective achievement areas (r's of about .5)(Marsh & Shavelson, 1985).

For the present study, we hypothesized that all components of the I/E model would generalize to the American sample. That is, we predicted a direct positive path from math achievement to math self-concept and from verbal achievement to verbal self-concept. In addition, we predicted direct negative paths from verbal achievement to math self-concept and from math achievement to verbal self-concept. Whereas math and verbal achievements were predicted to be highly correlated, math and verbal self-concepts were expected to be relatively uncorrelated due to the combined operation of the internal and external comparison processes (assuming that the two processes were of the same magnitude). Second, consistent with the typical Marsh studies, we predicted no gender differences.

METHODS

Subjects

Participants were 152 seventh and eighth graders (98 females and 54

males) from a public middle school in north Florida. Written parental consent was obtained for all participants.

Measures

Academic Achievement. Each student's most recent math and language arts class grades were obtained from computerized school records. Two sets of grades received six weeks apart were obtained.

Self-concept. Math and verbal self-concepts were assessed using the Self-Description Questionnaire-II (SDQ-II) (Marsh, 1990b) and the Academic Perception Questionnaire (APQ) (Licht, Stader, & Swenson, 1989). The SDQ-II has 104 items and assesses ten domain-specific self-concepts. Only the SDQ-II math and verbal self-concept scales, each consisting of 10 items, were analyzed. Respondents answered the items (e.g., "I have always done well in math") on a 6-point scale, ranging from "False" to "True". The APQ was adapted from a questionnaire developed by Licht, Stader, & Swenson (1989). Only the APQ verbal and math self-concept scales were analyzed. For each academic area, the APQ includes two questions about how "smart" they are and two questions about school performance. (All questionnaires were administered in groups, with no more than 20 students per group. Each testing session lasted 50 minutes.)

Description of Analyses. In the first series of analyses, LISREL causal modeling was used with the SDQ-II math and verbal scales as the only indicators of math and verbal self-concepts, respectively (see Figure 1). Each achievement area had two indicators ,i.e., the two grades received six weeks apart.

In the second series of analyses, we examined the generalizability of the I/E model with indicators that appeared to be conceptually "purer" measures of math and verbal self-concepts than those employed in prior research. Specifically, the SDQ-II scales were altered to exclude affective and inferential items (e.g., "I hate mathematics"). These altered scales retained those items that appeared to be conceptually purer indicators of students' self-perceived ability and/or performance (e.g., "I have trouble understanding anything with mathematics in it"; "I have always done well in mathematics"). The altered math and verbal scales each had 5 items. Additionally, the APQ math and verbal self-concept scales were employed as second indicators of math and verbal self-concepts. The two sets of grades were again used as indicators of math and verbal achievement.

Multi-sample analyses were employed to examine if there were gender differences in the operation of I/E model. Two series of multi-sample analyses were conducted; one with the initial indicators and the second with altered and added indicators.

RESULTS AND DISCUSSION

Several findings were robust across the various LISREL analyses, which

showed relatively good indices of fit. (See Figure 2 for path effects found in this study.) (1) As predicted, verbal and math self-concepts were uncorrelated, whereas math and verbal achievements were highly and significantly correlated (r's .62 to .72). (2) The positive paths from math achievement to math self-concept (*B*'s of .67 to .76) and from verbal achievement to verbal self-concept (*B*'s of .43 to .54) were both significant (i.e., support for the external frame of reference). (3) While the negative path from verbal achievement to math self-concept (*B*'s of .21 to .41) was generally significant (i.e., support for the internal frame of reference), the hypothesized negative path from math achievement to verbal self-concept did not reach significance. This finding was consistent with Skaalvik and Rankin (1990).

These findings held despite the alterations of the SDQ-II math and verbal self-concept scales to exclude inferential and affective items and the additions of the APQ math and verbal scales as second indicators of the latent variables of math and verbal self-concepts. Consistent with Marsh and his colleagues, we found no evidence of gender differences in the operation of the I/E model.

Support for the negative path from verbal achievement to math self-concept suggests that students' math self-concepts were influenced by the internal comparison processes in addition to the external process. Thus, given two early adolescent students with the same math achievements, the one with a higher verbal achievement would have a lower math self-concept. Although students' verbal self-concepts were influenced by the external comparison process, verbal self-concept appeared less susceptible to internal comparisons, as suggested by the lack of a significant negative path from math achievement to verbal self-concept. Thus, given two early adolescent students with the same verbal achievements, the one with the higher math achievement would not have a lower verbal self-concept.

There are several plausible explanations of why the negative path from verbal achievement to math self-concept was significant, but the negative path from math achievement to verbal self-concept was not. For example, verbal self-concept has many non-academic determinants besides one's performance in language arts, the impact of the internal comparison with one's math performance may be less salient for one's verbal self-concept. This study enhances our understanding of one reason why students' self-concepts may overestimate or underestimate their prior achievements. This information can help us better serve adolescents.

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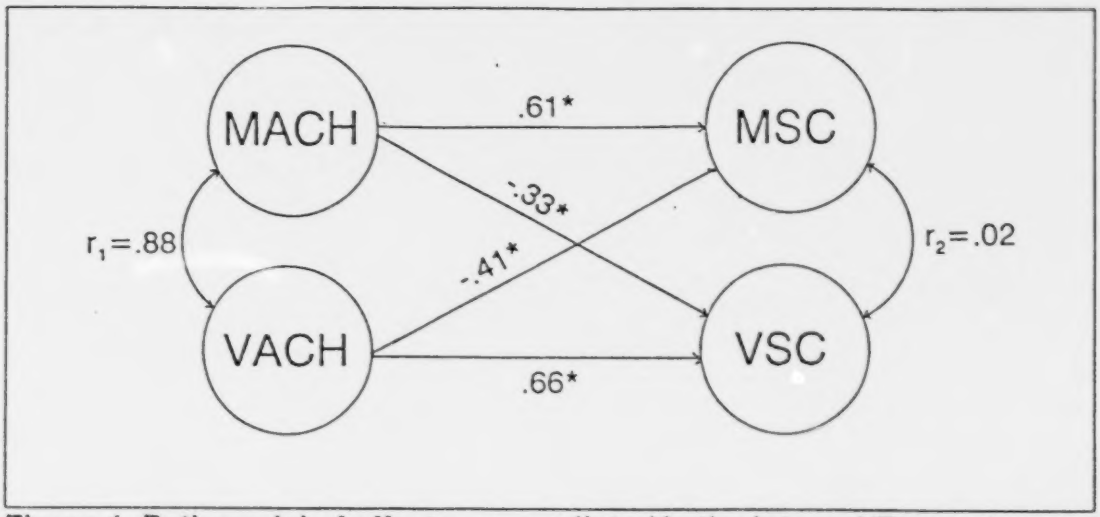

Figure 1. Path model of effects, as predicted bythe Internal/External model by Marsh (1990). LISREL causal modeling (Joreskog & Sorbom, 1987) is the statistical method employed.

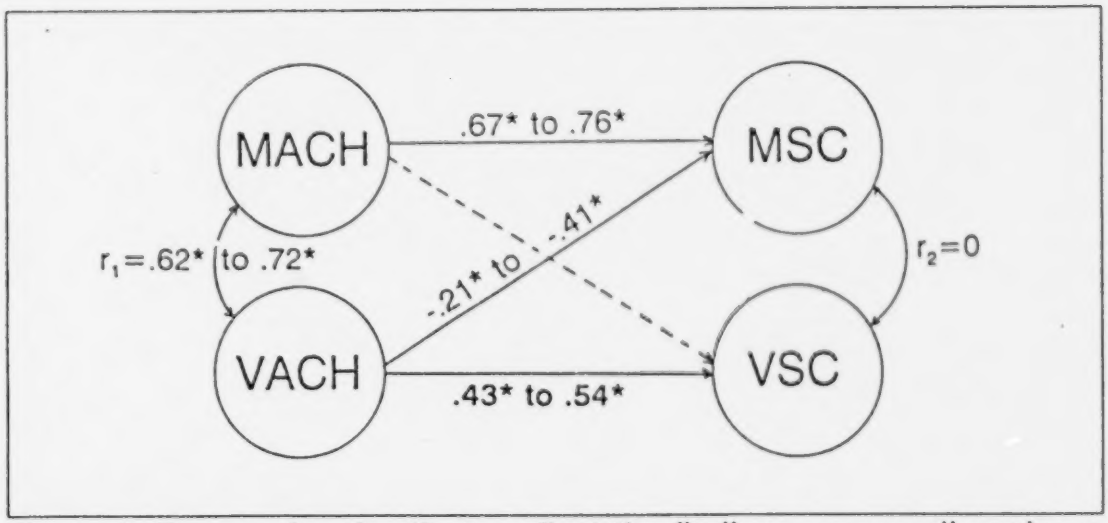

Figure 2. Range of path effects reflects the findings across all analyses conducted in this study.